State of California
California Environmental Protection Agency

AIR RESOURCES BOARD

STAFF REPORT

Public Hearing to Consider Adoption of Certification Procedures for Aftermarket Parts for Off-Road Vehicles, Engines and Equipment

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I. INTRODUCTION AND BACKGROUND

A. Introduction

Since 1966 the California Air Resources Board (ARB) has regulated emissions from motor vehicles by adopting and implementing emission standards for motor vehicles. Motor vehicle manufacturers have been able to comply with these increasingly stringent emission standards by developing and incorporating systems and components designed to reduce emissions from vehicles (e.g., catalytic converters, exhaust gas recirculation systems, air injection systems, etc.). The proper operation of these emission control systems and components throughout their entire life is essential in reducing motor vehicle emissions. Therefore, California Vehicle Code (VC) Section 27156 prohibits any modifications to any required motor vehicle pollution control device.

One category of motor vehicle pollution control device modifications involves the installation of aftermarket parts in motor vehicles. An aftermarket part is simply any device used on a vehicle that was not part of the vehicle when it was originally sold. This could be anything from a simple replacement fuel hose to a turbocharger, carburetor, or computer chip. Because such modifications may compromise the effectiveness of vehicles' emission control systems, the ARB has developed regulations that prohibit the sale, offer for sale, or installation of aftermarket parts, unless such parts have been exempted by the ARB from the provisions of VC Section 27156. ARB generally requires aftermarket parts manufacturers to demonstrate, through vehicle testing, that an aftermarket part will not increase vehicle emissions before exempting that part. An exempted part must also not adversely affect the durability of the vehicle's emission control system. Similar exemption requirements have been developed for aftermarket alternative fuel retrofit systems (systems designed to allow a motor vehicle to operate on alternative fuel).

B. Background of ARB's Off-Road Control Program

In 1988 the California legislature enacted the California Clean Air Act (CCAA), which directed the ARB to attain state ambient air quality standards at the earliest practicable date. In enacting the CCAA, the legislature recognized the importance of controlling emissions from previously unregulated sources, such as off-road mobile sources. These sources include lawn and garden equipment, marine vessels, recreational vehicles, farm and construction, and industrial equipment. The CCAA amended Section 43013 of the California Health and Safety Code (HSC) to grant ARB the authority to regulate off-road or nonvehicle engine categories, and added HSC Section 43018 which directed ARB to hold workshops and hearings to consider adoption of standards and regulations regulating off-road vehicles, farm and construction equipment, motorcycles, locomotives, utility engines, and to the extent permitted by federal law, marine vessels.

In November 1994 the ARB adopted the 1994 State Implementation Plan (SIP) for ozone. The

1994 SIP is heavily dependent upon emission reductions from off-road mobile sources in order to achieve the federal ambient air quality standards for ozone. For example, the 1994 SIP estimates that off-road mobile sources contributed 630 tons per day of oxides of nitrogen (NOx) emissions in the South Coast Air Basin, which constitutes approximately 23 percent of the total NOx emissions. By the year 2010, almost 140 tons per day of NOx emissions will be needed to be eliminated from off-road mobile sources for California to attain state and federal air quality standards.

To date, the ARB has enacted regulations specifying emission standards and test procedures for small off-road engines rated at less than 25 hp; heavy-duty diesel cycle (compression ignition) engines rated at 175 hp and greater; and, recreational vehicles and engines. Additionally, the ARB is currently developing regulations for the off-road categories of marine engines and off-road large spark-ignited engines.

Based on its experience with on-road motor vehicles, the ARB is concerned that the installation of unregulated aftermarket parts in off-road mobile sources could compromise the effectiveness and/or durability of emission control systems in such sources. Therefore, the ARB has generally prohibited the installation of aftermarket parts on the off-road categories discussed above. However, the ARB is proposing at this time to adopt certification procedures for off-road aftermarket parts that will allow aftermarket parts manufacturers to demonstrate that their parts do not increase emissions. These certification procedures will therefore allow aftermarket parts manufacturers to participate in a market that was previously not available to them, while also helping to insure the integrity of the ARB's entire off-road regulatory program.

C. Background on On-Road Aftermarket Part and Conversion Kit Certification Procedures

At present all conversion kit modifications or aftermarket parts for on-road vehicles in California fall into one of three categories: add-on parts, modified parts, and replacement parts. Staff proposes using these same designations for off-road sources as described below.

Add-On Part means any aftermarket part which is not a modified part or a replacement part.

Modified Part means any aftermarket part intended to replace an original equipment emissions-related part and which is not functionally identical to the original equipment part in all respects which in any way affect emissions, excluding a consolidated part.

Replacement Part means any aftermarket part intended to replace an original equipment emissions-related part and which is functionally identical to the original equipment part in all respects which in any way affect emissions (including durability), or a consolidated part.

Note that aftermarket regulations and anti-tampering regulations do not apply to the vehicles/engines/equipment that were manufactured before the applicable emission control regulations took effect for the corresponding category of off-road sources.

D. Statutory Authority

Currently, the off-road regulations prohibit the use of add-on or modified parts. In addition, VC Sections 27156 and 38391 prohibit the advertisement, sale, or installation of such parts on most off-road mobile sources. VC Sections 27156 and 38391 authorize the ARB to exempt add-on or modified parts from the VC prohibitions only if such parts:

1) do not reduce the effectiveness of any required emission control devices; or,

2) do not cause the modified vehicle/engine/equipment to exceed applicable emission standards.

In order to ensure that aftermarket part and converter kit manufacturers are not precluded from selling add-on or modified parts in the off-road categories, staff is proposing to adopt an anti-tampering provision analogous to the provisions in VC Sections 27156 and 38391, but which would apply uniformly to all categories of off-road mobile sources, except for locomotives and locomotive engines. This would help ensure that the proposed aftermarket certification procedures are consistently and fairly applied to all categories of off-road mobile sources. Staff believes that the proposed regulations will provide appropriate guidelines for manufacturers and encourage standardization in this industry which will benefit both manufacturers and purchasers.

II. SUMMARY OF ARB STAFF PROPOSAL

In this section we provide a plain English discussion of the staff's proposed regulations and explain the rationale for the proposed changes. The discussion in this section is intended to satisfy the requirements of Government Code section 11346.2(a)(1), which requires that a noncontrolling "plain English" summary of the regulation be made available to the public.

Staff proposes that the Board adopt regulations that would establish certification procedures for aftermarket parts for off-road sources. In addition, staff proposes the Board adopt regulations that would establish anti-tampering provisions for off-road sources that are currently unregulated by VC Sections 27156 and 38391, and that would amend the warranty regulations for currently regulated off-road sources to allow the sale, offer for sale, and installation of add-on and modified parts, provided such parts have been exempted in accordance with the procedures proposed herein. The proposed regulations will help insure that emission reductions from off-road sources are not compromised by installations of non-certified aftermarket parts, yet will also allow aftermarket part manufacturers to participate in a market that has been previously

closed to them. The proposed certification procedures are described in greater detail below.

A. Expanding Off-Road Anti-Tampering Provisions

Currently, the off-road regulations prohibit the use of add-on or modified parts. Advertising, selling, or installing these parts on most off-road mobile sources is also prohibited by VC Sections 27156 and 38391. However, these two sections only prohibit the installation of add-on or modified parts in off-road mobile sources that can potentially propel, move, or draw people or property upon land. Staff is therefore proposing to adopt an anti-tampering provision analogous to the provisions in VC Sections 27156 and 38391 that would apply to all currently unregulated off-road mobile sources. This would help ensure that the proposed aftermarket certification procedures are consistently and fairly applied to all categories of off-road mobile sources.

B. Affected Categories

1. Small Off-Road Engines

Small Off-Road Engines include all engines less than 25 hp used in off-road mobile applications, with the exceptions of off-road motorcycles, all-terrain vehicles (ATV) and engines used to propel marine vessels or watercraft. The proposed regulations are applicable to small off-road engines produced on or after January 1, 1995.

2. Heavy-Duty Off-Road Diesel Cycle Engines

The heavy-duty off-road diesel cycle engine and equipment category consists of off-road diesel-cycle engines that are:

(a) greater than or equal to 50 hp and less than 100 hp manufactured on or after January 1, 1998, and certified to meet the federal emission standards and certification provisions;

(b) greater than or equal to 100 hp and less than 175 hp manufactured on or after January 1, 1997, and certified to meet the federal emission standards and certification provisions; and

(c) diesel cycle and alternative fueled diesel cycle engines equal to 175 hp and above for off-road engines produced on or after January 1, 1996, and certified to meet California's exhaust emission standards and test procedures. This last category includes engines used in farm and construction equipment, as well as mining, forestry, and industrial equipment.

3. Recreational Vehicles and Engines

The off-road recreational vehicle subcategory includes off-road motorcycles, ATVs, go-karts, golf carts (new golf carts used in areas that do not meet the federal ozone standards will continue to be subject to the existing zero-emission requirement) and specialty vehicles such as vehicles with at least three wheels used to haul light loads in airports, hotels, and resorts. Engines used in these vehicles consist of both 2- and 4- stroke configurations and range in power from 8 hp for golf carts to over 30 hp for the larger off-road motorcycles and specialty vehicles. The proposed regulations are applicable to new specialty vehicle engines under 25 hp produced on or after January 1, 1995 and all other new small off-road engines produced on or after January 1, 1997.

4. Gasoline Spark-Ignited Marine Engines

The ARB is currently developing regulations for gasoline spark-ignition marine engines, including outboard engines and personal watercraft. Outboard engines are defined as integrated engine and drive units externally mounted to the hulls of the watercraft. Personal watercraft engines are defined as watercraft that are not outboards, inboards, or sterndrive engines; such engines encompass watercraft commonly known as personal watercraft (Jet Skis, Wave Runners, etc.) and jet boats (the newer class of inboard style watercraft using two-stroke jet propulsion).

Staff is currently scheduled to present its marine engine proposal to the Board in December of this year. Until the marine engine regulations are formally adopted, staff proposes to utilize the U.S. EPA's definitions, standards, and test procedures for gasoline spark-ignition marine engines as set out in 40 Code of Federal Regulations Part 91.

C. Test Procedures

Table 1 lists the categories of off-road mobile sources currently regulated by the ARB or the U.S. Environmental Protection Agency and the corresponding certification standards and test procedures. These same standards and test procedures are proposed for the applicable aftermarket part certification.

Table 1: Off-Road Categories, Certification Standards and Test Procedures

CATEGORY	CERTIFICATION STANDARDS	TEST PROCEDURES
1. Small Off-Road Engines	Exhaust Emission Standards and Test Procedures - Small Off-Road Engines, amended, _____; Title 13, California Code of Regulations (CCR), Section 2403.	Exhaust Emission Standards and Test Procedures - Small Off-Road Engines, amended, _____; CCR, Title 13, Section 2403(c).
2. a) Heavy-Duty Diesel Engines (50-175 hp)	Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards; 40 Code of Federal Regulations (CFR) Section 89.112-96. *Opacity*: 40 CFR Section 89.113-96	*NOx, CO, and HC*: 40 CFR Part 89 Subpart E *PM*-California Exhaust Emission Standards and Test Procedures for New 1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines, adopted May 12, 1993. 40 CFR Section 89.112-96. *Opacity*: 40 CFR Part 86, subpart I; 40 CFR Section 89.113-96(b).
b) Heavy-Duty Diesel Cycle Engines (175 hp and greater)	Exhaust Emission Standards and Test Procedures - Heavy-Duty Off-Road Diesel Cycle Engines, Title 13, CCR, Section 2423 (b).	California Exhaust Emission Standards and Test Procedures for New 1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines, adopted May 12, 1993; Title 13, CCR, Section 2423(c)(1); *Opacity*: California Smoke Test Procedures for New 1996 and later Heavy-Duty Off-Road Diesel Cycle Engines, adopted May 12, 1993; Title 13, CCR, Section 2423(c)(2).
3. Recreational Vehicles and Engines	Emission Standards and Test Procedures - New Off-Highway Recreational Vehicles and Engines, Title 13, CCR, Section 2412(b), (e).	Emission Standards and Test Procedures - New Off-Highway Recreational Vehicles and Engines, Title 13, CCR, Section 2412 (c)(1), (2).
4. Gasoline Spark-Ignition Marine Engines	Exhaust emission standards for outboard and personal watercraft engines; 40 CFR Section 91.104.	Gaseous Exhaust Test Procedures-40 CFR Part 91, Subpart E.

III. DISCUSSION OF RECOMMENDED ACTION

A. Application Process

The first step for an aftermarket manufacturer is to determine if their part is an add-on or modified part or replacement part. Staff would assist the manufacturer to ensure that the appropriate test procedure is used. Figure 1 provides, via a flowchart diagram, the proposed procedure for obtaining an exemption for off-road aftermarket parts.

For replacement parts, a manufacturer shall exercise its engineering judgment to determine whether an aftermarket part in fact qualifies to be considered a replacement part according to the criteria set out in Title 13, CCR, Section 1900(b)(13). For example, an exhaust manifold that is "chromed" but has the same dimensions as the original part, would be considered a replacement part. If, however, an aftermarket part differs from an OEM part is some emissions critical aspect (for example, an OEM two barrel carburetor with an aftermarket four barrel carburetor) the part would no longer be considered "functionally identical" and therefore would not be a replacement part, but a modified part. As with the on-road aftermarket part procedures, the ARB requires an off-road aftermarket replacement part to be functionally identical to an original equipment part in all respects which in any way affect emissions. Through engineering judgement, the manufacturer shall identify the critical specifications for each part which will affect emissions. If the critical specifications are determined to be functionally identical to the OEM part, the aftermarket part manufacturer does not need to submit an application to the ARB. The manufacturer shall, however, maintain records of the information used to determine equivalence for a period of two years. ARB reserves the authority to review records and/or conduct enforcement testing of replacement parts.

Manufacturers of off-road add-on and modified parts that intend to sell these products for use on California vehicles/engines/equipment would be required to obtain an exemption from the ARB prior to advertising, selling, or installing these parts. ARB would exempt such parts that were demonstrated to not increase emissions above the applicable off-road mobile source category certification standards.

To obtain an exemption would be for an aftermarket parts manufacturer to contact ARB staff to obtain the appropriate application. Note that for catalytic converters and alternative fuel systems, specific exemption procedures have been developed. All other parts use the more generic procedures for add-on and modified parts.

As with the on-road aftermarket parts exemption program, an off-road aftermarket parts manufacturer would be responsible for obtaining and testing vehicles/engines/equipment at qualified, independent laboratories. The ARB would reserve the right to perform confirmatory testing; if such testing was performed at ARB's laboratory, the manufacturer would provide the test vehicle/engines/equipment but would not be responsible for any additional costs.

Currently manufacturers of aftermarket parts for on-road vehicles have two options to demonstrate compliance with the on-road aftermarket certification procedures. In the first option, a manufacturer can demonstrate through testing that the exhaust emissions from a test vehicle with an aftermarket part installed is in compliance with the California new vehicle exhaust emissions standards for the vehicle class and model year of the test vehicle. In the second option, a manufacturer may elect to conduct comparative emission tests ("back-to-back tests") to demonstrate compliance with the on-road aftermarket certification procedures. The aftermarket parts are in compliance if the difference between the device emission test result and the baseline emission test result is equal to or less than the percent limits as set forth by the ARB for each of the component elements of exhaust emissions for hydrocarbon, carbon monoxide, oxides of nitrogen, particulate matter (diesel only), and evaporative emissions.

Under the proposed regulations, manufacturers of off-road aftermarket parts must demonstrate that the exhaust emissions from the off-road test vehicle/engine/equipment are in compliance with the applicable vehicle/engine/equipment exhaust emissions standards. Staff rejected the option of allowing back-to-back testing for off-road aftermarket parts manufacturers for the following reasons: (1) by eliminating this option staff decreased the burden on the manufacturer of having to perform a minimum of four emissions test for each test vehicle/engine/equipment; (2) there is insufficient off-road in-use data to support the development of typical baseline percent compliance limitations (i.e., percent caps on the allowable increase from the baseline of exhaust emission component elements); (3) back-to-back testing may allow an increase in the emissions levels when compared to the exhaust emission standards of the model year of the test vehicle\engine\equipment; (4) and, test variability can also establish significant increases in emissions.

Manufacturers would need to support their certification application with sufficient technical information to establish that their add-on or modified parts would not cause the vehicle/engine/equipment to exceed its applicable certification standards. After examining the application and supporting data, the ARB would exempt qualifying parts by issuing the manufacturer an executive order allowing the part to be legally sold and used in California.

(Insert Figure 1)

B. Add-On or Modified Parts

A modified part is any aftermarket part intended to replace an original emission-related part and which is not functionally identical to the original equipment part and affects emissions; such parts include consolidated parts. For on-road vehicles, add-on or modified parts manufacturers are required to apply for and receive an exemption from the ARB in order to be able to legally advertise, offer for sale, sell, or install their parts in California. In order to receive an exemption from the ARB, an on-road add-on or modified part manufacturer must demonstrate to the ARB that the modified vehicle can meet its certification standards for the warranty period. The Executive Officer grants an exemption to the manufacturer for parts that satisfy the on-road aftermarket certification procedures.

The off-road add-on and modified parts certification procedures are closely modeled on the on-road aftermarket parts procedures because add-on and modified parts are generally used for identical purposes, regardless of the application category. In order to obtain an exemption from the ARB, an off-road aftermarket parts manufacturer must demonstrate to the ARB that the modified vehicle/engine/equipment can meet the applicable certification emission standards over the warranty, durability, or useful life period for the application category (i.e., small off-road engine, heavy-duty diesel, etc.). Table 2 provides examples of typical add-on or modified parts for each off-road category.

Table 2: Examples of Typical Add-On Parts

CATEGORY	TYPICAL ADD-ON PARTS
1. Small Off-Road Engine	Catalyst, Carburetors, etc.
2. Heavy-Duty Diesel Cycle Engine	Turbochargers, Particulate Traps, Catalysts, Fuel Injectors, etc.
3. Recreational Vehicles and Engines	Air Induction Systems, Spark Plugs, Exhaust Systems, Ignition Systems, Camshaft, etc.
4. Gasoline Spark-Ignition Marine Engines	Exhaust and Intake Manifolds, Headers, Turbochargers, Carburetors, Pistons, etc.

C. Alternative Fuel Conversion System

An alternative fuel conversion system is a package of fuel, ignition, emission control, and engine components that are modified, removed, or added during the process of modifying a vehicle/engine/equipment to operate on an alternative fuel and to perform at an emission rate lower than or equal to the rate to which the engine family was originally certified. Regulations regarding the conversion of on-road vehicles to use alternative fuels were first adopted in the 1970s. Subsequently, the Board has amended the original regulations to ensure that converted vehicles would remain in compliance with applicable emission standards. The amendments include provisions requiring the proper installation of conversion systems since poor installations can result in non-compliance. The proposed off-road certification procedures for systems designed to convert vehicles, engines, and equipment to alternative fuels closely parallel the on-road requirements.

Like on-road conversion system manufacturers, off-road conversion system manufacturers would assume some of the off-road original vehicle/engine/equipment manufacturer's responsibility for meeting emission standards over the useful life of the vehicle/engine/equipment. Additionally, the conversion system installer is also subject to certain requirements under the conversion system procedures. For example, the installer must follow the conversion system manufacturer's installation procedures and warrant the installation.

D. Catalytic Converters

The ARB will exempt new aftermarket non-original equipment catalytic converters for on-road vehicles if such converters meet the criteria in the on-road aftermarket catalytic converter certification procedures. An exempt aftermarket non-original equipment ("non-OEM") catalytic converter can only replace a catalytic converter of the same type. In addition, aftermarket non-OEM catalytic converters which are exempted cannot be installed in any on-road vehicle which is under warranty. The proposed off-road aftermarket catalytic converter certification procedures closely parallel the on-road requirements with some exceptions.

While the on-road procedures require a converter manufacturer to provide data to verify catalytic efficiency, staff determined that an off-road converter manufacturer needs only prove through exhaust emissions testing that the vehicle/engine/equipment with the replacement catalyst can meet the exhaust emission standards for the model year of the test vehicle/engine/equipment. This will allow a converter manufacturer to generate less compliance data, while at the same time realizing the emission benefits from the off-road program will continue to be realized.

E. Aftermarket Part Manufacturer Responsibilities

(1) Useful Life

During the off-road vehicle's/engine's/equipment's useful life, the aftermarket parts manufacturer is responsible for the proper functioning of emissions related equipment.

(2) Warranties

The aftermarket parts manufacturer and aftermarket parts installer must warrant aftermarket parts and conversions systems. An installer must pay the vehicle operator for damages if a conversion system is improperly installed or tampered.

IV. AIR QUALITY, ENVIRONMENTAL AND ECONOMIC IMPACTS

A. Air Quality and Environmental Impacts

1. Impacts on the 1994 Ozone SIP and Inventory

The 1994 State Implementation plan (SIP) for Ozone is California's master plan for achieving the federal ozone standard in all areas of the state by the year 2010.

The 1994 Ozone SIP includes state measures to control emissions from sources including motor vehicles and pesticides, local measures for stationary and area sources, and federal measures for sources under exclusive or practical federal control. The 1994 Ozone SIP was approved by the U.S. EPA in September 1996. Although the U.S. EPA has not yet approved subsequent plan revisions for ozone, carbon monoxide, and particulate matter, these plans also rely on measures in the 1994 Ozone SIP.

a. Inventory

HSC Section 39607(b) requires the ARB to inventory sources of air pollution within the air basins of the state and determine the kinds and quantities of air pollutant emitted. Since the 1994 SIP was adopted, substantial improvements have been made to the emissions inventory. Updated data on activity, growth, population, emission rates (including emissions deterioration), and which engine applications are exclusively under the jurisdiction of the U.S. EPA (i.e., are preempted), have been incorporated into the revised inventory. The result is that

the HC+NOx emissions from the population of uncontrolled engines triples to over 200 tons per day by 2010. Much of this increase results from new testing which has shown that these engines experience deterioration as they age, resulting in increased emissions over time. At the time of the regulation (1990) and SIP (1994) adoption, emission deterioration was not thought to occur. As a result, the ARB has continued to develop programs that would effectively address the reduction of these previously unaccounted for emissions.

2. Assessing the Impacts of the Proposal

Many of ARB's mobile source control measures require new technology to be developed or existing technology to be applied in new ways. These measures are developed by ARB staff with the intention of attaining ambient air quality standards by reducing emissions to specified levels. Since the SIP was approved, the ARB has continued to refine and improve the emissions inventory by collecting data on activity, population, growth, etc. This proposal would ensure that modifications made to certified off-road vehicles, engines, or equipment would be durable, reliable, and would not adversely affect vehicle/engine/equipment emissions.

Potential air quality benefits can result from converting an off-road vehicle/engine/equipment to alternative fuels. These potential air quality benefits would vary greatly, depending on the number of off-road vehicles/engines/equipment converted, type of conversion, pre- and post-conversion emission levels, and vehicle/engine/equipment usage. Because of the uncertainty, particularly in the number of off-road vehicles/engines/equipment that might be converted, the potential air quality benefits are not estimated.

B. Economic Impacts

1. Cost of Off-Road Vehicle/Engine/Equipment Add-On or Modified Parts and Conversions

The installation of add-on or modified parts to off-road vehicles/engines/equipment or the conversion to alternative fuels is optional. Businesses would presumably only participate in the aftermarket certification program if it were financially advantageous. Therefore, there are no mandated costs to off-road vehicle/engine/equipment operators or manufacturers of such aftermarket parts. Depending on the age and types of vehicles involved, the fleet size, the fuel used, and the type of conversion conducted, the cost and the amount of emission reductions will vary.

2. Cost to State Agencies

The proposed certification procedures for new aftermarket devices for the off-road category would not create costs to any state agency, local district, or school district.

3. Potential Economic Impacts

Staff has evaluated the potential economic impact on California businesses of the proposed new aftermarket part and conversion system certification procedures for the off-road category. The businesses that may be affected include manufacturers and installers of add-on and modified parts and conversions systems, and businesses operating commercial conversion fleets. An amendment to Section 11346.53 of the Government Code requires that, in proposing to adopt or amend any administrative regulation, state agencies shall assess not only the potential for adverse economic impacts on California business enterprises and individuals, but also the ability of California businesses to compete with businesses in other states. Also, a new section to the Government Code (Section 11346.54) requires state agencies to assess the potential impact of their regulations on California jobs and on business expansion, elimination, or creation.

The aftermarket industry is currently prohibited from installing add-on or modified parts on currently regulated off-road vehicles/engines/equipment. The proposed regulations ensure that off-road aftermarket part and converter kit manufacturers are not precluded from participating in the aftermarket exemption process. Staff believes that the proposed regulations will create job opportunities and a new market so that aftermarket part and converter kit manufacturers can legally sell their devices for use on currently regulated off-road vehicles/engines/equipment.

The addition of parts or the conversion of the vehicle/engine/equipment to alternative fuels is optional. Therefore, there are no mandated costs to vehicle/engine/equipment operators. Depending on the ages and types of vehicles/engines/equipment involved, the fleet size, the fuel used, and the type of part or conversion conducted, the cost and the amount of emission reductions will vary.

The typical cost ranges for performing two emissions tests, one without the modification and one with the modification, is given below in Table 3. These estimates are based upon discussions with exhaust emission test laboratories. These costs do not include the cost for shipping a vehicle/engine/equipment to and from the test facility to the applicant nor do they include any of the manufacturers design costs.

Table 3: Costs Related To Testing

CATEGORY	Testing Costs
1. Small Off-Road Engine	$18,000
2. Heavy-Duty Diesel Cycle Engine	$20,000
3. Recreational Vehicles and Engines	$1,600 - $3,000
4. Gasoline Spark-Ignited Marine Engines	$19,000

C. Regulatory Alternatives

1. No action

Staff rejected this alternative because the aftermarket industry would be legally prohibited from selling add-on and modified parts for off-road vehicles, engines, and equipment. Moreover, the lack of any regulations may be an incentive to use illegal low-quality parts which could increase emissions.

In addition, the potential air quality benefits of increased conversions could not be realized. Converting off-road vehicles/engines/equipment represents an established, commercially proven way of increasing the fleet of an alternative fuel infrastructure, and is a potential source of low-emission vehicles/engines/equipment.

2. Back-to-Back Testing

For off-road categories, the baseline emission levels are the exhaust emission standards for the model year of the test vehicle/engine/equipment. Test procedures are applicable to the vehicle/engine/equipment category and for the model-year of the vehicle/engine/equipment. For on-road vehicles, aftermarket part manufacturers may elect to conduct comparative emission tests (i.e, "back-to-back" testing) to demonstrate compliance with the on-road aftermarket certification procedures. Staff rejected the option of allowing back-to-back testing for off-road aftermarket parts manufacturers for the following reasons: (1) by eliminating this option staff decreased the burden on the manufacturer of having to perform a minimum of four emissions test for each test vehicle/engine/equipment; (2) there is insufficient off-road in-use data to support the development of percent compliance limitations (i.e., percent caps on the allowable increase from the baseline of exhaust emission component elements); (3)

back-to-back testing would allow an increase in the emissions levels when compared to the exhaust emission standards of the model year of the test vehicle\engine\equipment ; and, (4) test variability can also establish significant increases in emissions.

3. Conclusion

No alternative considered by the agency would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective or less burdensome to affected private persons than the proposed regulation